

GSMDC3902X

30V N-Channel MOSFETs

Product Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications.


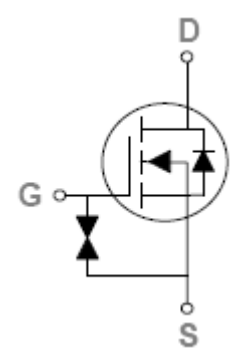
Features

- 30V, 130A, $R_{DS(ON)}=1.6m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN5X6-8L package design

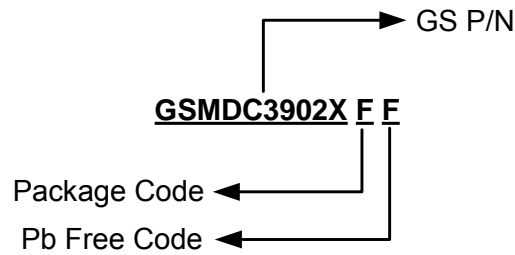
Applications

- MB / VGA / Server Vcore
- POL Applications
- SMPS 2nd SR
- BMS System

Packages & Pin Assignments

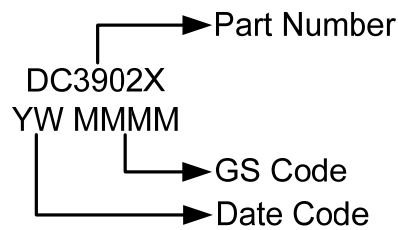
GSMDC3902XFF (DFN5X6-8L)	
 <p>Top View</p>	
	
Pin	Description
1	Source
2	Source
3	Source
4	Gate
5	Drain
6	Drain
7	Drain
8	Drain

Ordering Information



Part Number	Package	Quantity
GSMDC3902XFF	DFN5X6-8L	3000 PCS

Marking Information



Absolute Maximum Ratings

$T_C=25^{\circ}\text{C}$ Unless otherwise noted

Symbol	Parameter	Typical	Unit
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	130
		$T_C=100^{\circ}\text{C}$	82
I_{DM}	Pulsed Drain Current (Note 1)	260	A
EAS	Single Pulse Avalanche Energy (Note 2)	245	mJ
IAS	Single Pulse Avalanche Current (Note 2)	70	A
P_D	Power Dissipation ($T_C=25^{\circ}\text{C}$)	166	W
	Power Dissipation (Derate above 25°C)	1.33	W/ $^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to +175	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-55 to +175	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.9	$^{\circ}\text{C}/\text{W}$

Note 1: Repetitive Rating: Pulsed width limited by maximum junction temperature.

Note 2: $V_{DD}=25\text{V}$, $V_{GS}=10\text{V}$, $L=0.1\text{mH}$, $I_{AS}=70\text{A}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$.

Electrical Characteristics

T_J=25°C Unless otherwise noted

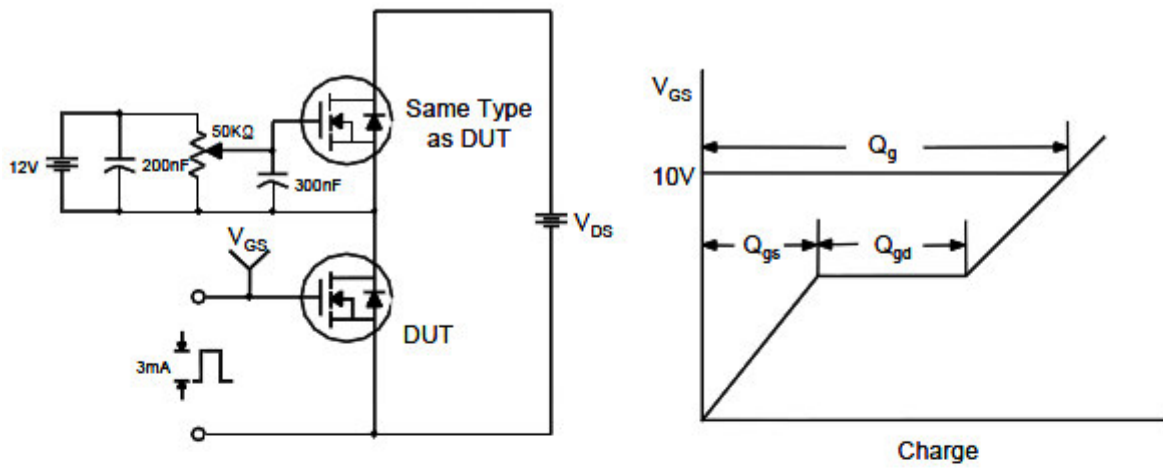
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1	1.6	2.5	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V			1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =125°C			10	
I _S	Continuous Source Current (Note 3)	V _G =V _D =0V, Force Current			130	A
I _{SM}	Pulsed Source Current (Note 3)				200	
R _{DS(on)}	Drain-Source On-Resistance (Note 3)	V _{GS} =10V, I _D =30A		1.2	1.6	mΩ
		V _{GS} =4.5V, I _D =15A		1.8	2.4	
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =15A		30		S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A			1	V
EAS	Single Pulse Avalanche Energy	V _{DD} =25V, L=0.1mH, I _{AS} =30A	45			mJ
Dynamic						
Q _g	Total Gate Charge (Note 3,4)	V _{DS} =15V, V _{GS} =4.5V, I _D =10A		64.8		nC
Q _{gs}	Gate-Source Charge (Note 3,4)			16.2		
Q _{gd}	Gate-Drain Charge (Note 3,4)			21		
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz		7720		pF
C _{oss}	Output Capacitance			945		
C _{rss}	Reverse Transfer Capacitance			436		
t _{d(on)}	Turn-On Time (Note 3,4)	V _{DD} =15V, I _D =15A, V _{GS} =10V, R _G =3.3Ω		24		ns
t _r				60		
t _{d(off)}	Turn-Off Time (Note 3,4)			90		
t _f				32		
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz		1.2		Ω

Note 3: The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.

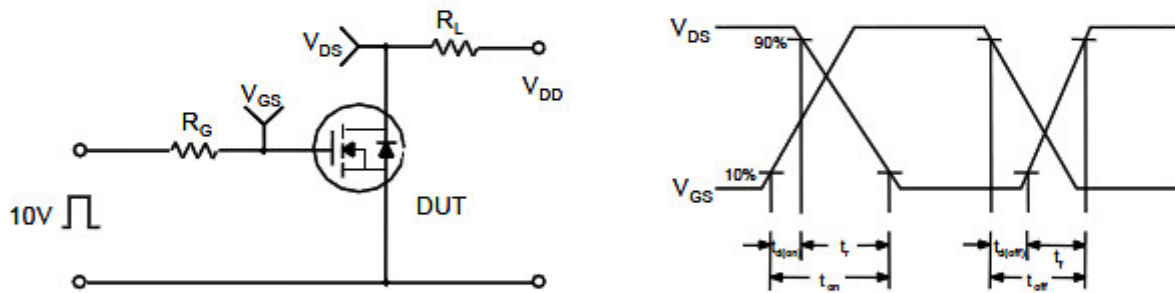
Note 4: Essentially independent of operating temperature.

Typical Performance Characteristics

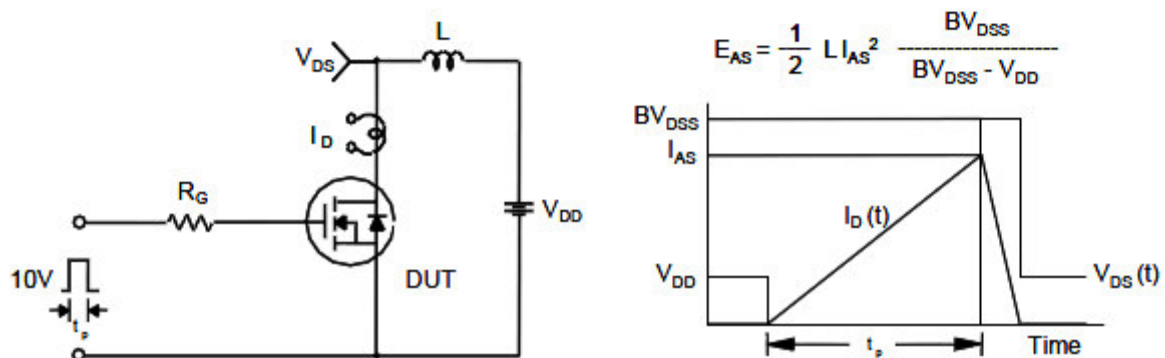
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

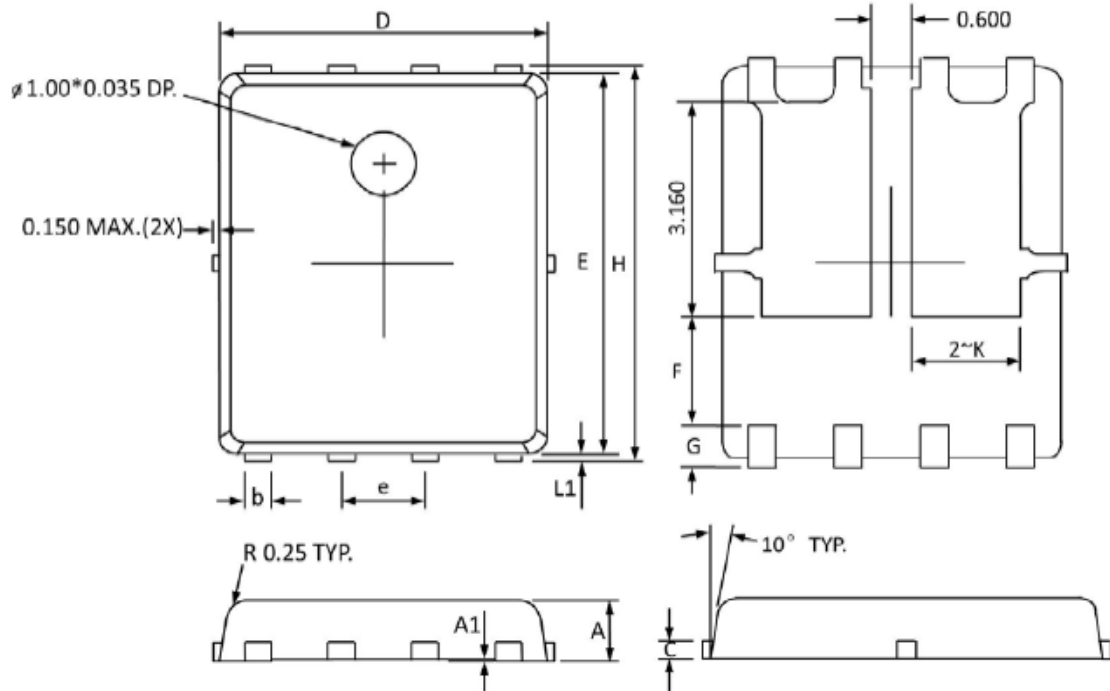


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

DFN5X6-8L







Dimensions




Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.490	0.014	0.019
C	0.254 (REF)		0.010 (REF)	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 (BSC)		0.050 (BSC)	
F	1.600 (REF)		0.063 (REF)	
G	0.600 (REF)		0.024 (REF)	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	1.600 (REF)		0.063 (REF)	



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